

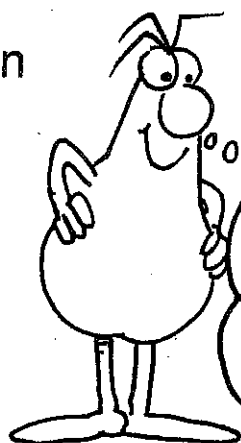


These numbers are compatible.
Can you tell why?

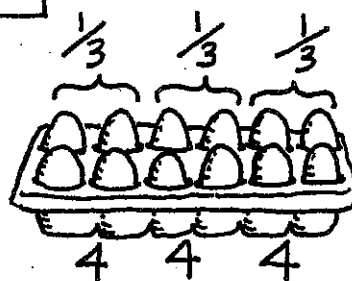
With compatibles, it's easy to find
the fractional part in your head.

Think of the unit fraction
first, and divide . . .

Then multiply to adjust
your answer.



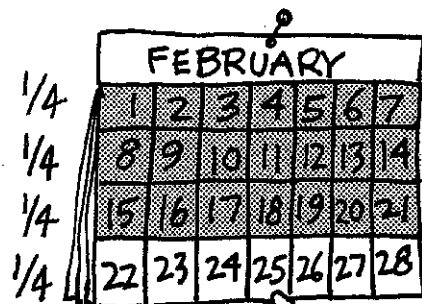
$$\frac{2}{3} \text{ of } 12$$



$$\frac{1}{3} \text{ of } 12 = 12 \div 3 = 4$$

$$\begin{aligned} \frac{2}{3} \text{ of } 12 &= 2 \times \left(\frac{1}{3} \text{ of } 12\right) \\ &= 2 \times 4 = 8 \end{aligned}$$

Now try this one.

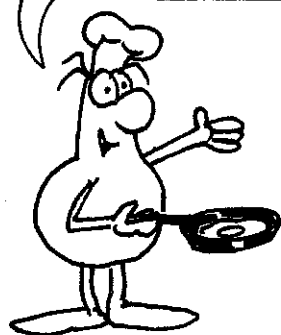


$$\frac{3}{4} \times 28$$

$$\frac{1}{4} \times 28 = 28 \div 4 = 7$$

$$\begin{aligned} \frac{3}{4} \times 28 &= 3 \times \left(\frac{1}{4} \times 28\right) \\ &= 3 \times 7 = 21 \end{aligned}$$

TRY THESE IN YOUR HEAD.
Divide, then multiply.



1. $\frac{1}{8}$ of 32

2. $\frac{3}{8}$ of 32

3. $\frac{5}{8}$ of 32

4. $\frac{3}{4}$ of 12

5. $\frac{17}{36}$ of 360

6. $54 \times \frac{5}{9}$

7. $\frac{5}{8} \times 48$

8. $50 \times \frac{3}{10}$

9. $\frac{3}{8} \times 72$

10. $\frac{4}{3} \times 12$

POWER BUILDER A

1. $\frac{1}{4}$ of 12 = _____
2. $\frac{1}{5}$ of 35 = _____
3. $\frac{1}{8}$ of 40 = _____
4. $\frac{1}{3}$ of 45 = _____
5. $\frac{1}{7}$ of 28 = _____
6. $\frac{3}{7}$ of 28 = _____
7. $\frac{1}{5}$ of 45 = _____
8. $\frac{2}{5}$ of 45 = _____
9. $\frac{1}{10}$ of 70 = _____
10. $\frac{3}{10}$ of 70 = _____
11. $\frac{4}{5}$ of 20 = _____
12. $\frac{3}{7}$ of 42 = _____
13. $\frac{3}{4}$ of 100 = _____
14. $\frac{2}{3}$ of 90 = _____
15. $\frac{3}{5}$ of 100 = _____
16. $\frac{5}{8}$ of 40 = _____
17. $\frac{2}{3}$ of 600 = _____
18. $\frac{3}{4}$ of 200 = _____
19. $\frac{4}{5}$ of 200 = _____
20. $\frac{2}{3}$ of 450 = _____

THINK IT THROUGH



Two-thirds of the number is 240.
What is the number?

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POWER BUILDER B

1. $\frac{1}{3}$ of 15 = _____
2. $\frac{1}{5}$ of 25 = _____
3. $\frac{1}{4}$ of 40 = _____
4. $\frac{1}{8}$ of 48 = _____
5. $\frac{1}{7}$ of 35 = _____
6. $\frac{2}{7}$ of 35 = _____
7. $\frac{1}{3}$ of 90 = _____
8. $\frac{2}{3}$ of 90 = _____
9. $\frac{1}{10}$ of 60 = _____
10. $\frac{3}{10}$ of 60 = _____
11. $\frac{3}{4}$ of 20 = _____
12. $\frac{2}{7}$ of 28 = _____
13. $\frac{4}{5}$ of 100 = _____
14. $\frac{3}{4}$ of 80 = _____
15. $\frac{2}{5}$ of 100 = _____
16. $\frac{3}{8}$ of 80 = _____
17. $\frac{2}{3}$ of 300 = _____
18. $\frac{3}{4}$ of 100 = _____
19. $\frac{4}{5}$ of 200 = _____
20. $\frac{2}{3}$ of 900 = _____

THINK IT THROUGH



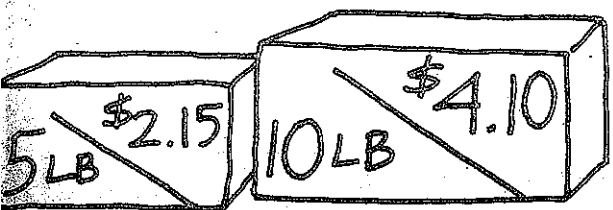
Three-fourths of the number is 1200.
What is the number?

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To save money when we shop, we need to compare prices. Here's one way to do this:

Find a way to compare equal amounts. That way you learn just how much you can save with the better buy.



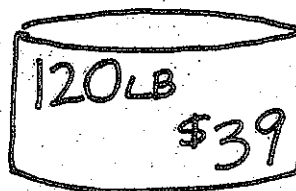
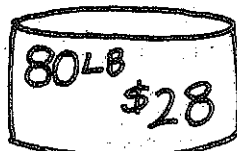
$$2 \times 5 \text{ LB} = 10 \text{ LB}$$

$$2 \times \$2.15 = \$4.30$$

I can save 20 cents if I buy the 10-lb size!



Sometimes you will need to use fractions to make equal amounts.

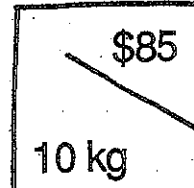
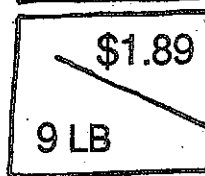
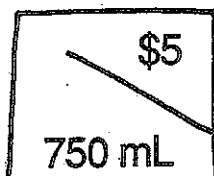
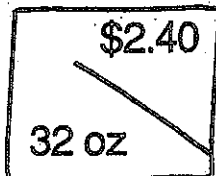
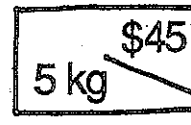
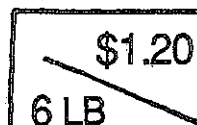
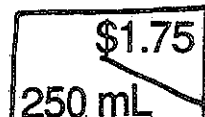
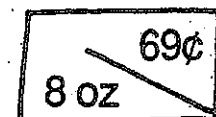


$$\frac{3}{2} \times 80 \text{ LB} = 120 \text{ LB}$$

$$\frac{3}{2} \times \$28 = 3 \times \frac{1}{2} \text{ of } \$28 = 3 \times 14 = \$42$$

Savings of \$3 if I buy the 120-lb barrel!

TRY THESE IN YOUR HEAD.
Find the better buy and the savings.



POWER BUILDER A

Determine the better buy. Circle it.

- | | | | | | |
|---------------------|----|-------------------|----------------------|----|-------------------|
| 1. 3 ft for \$1.50 | or | 6 ft for \$2.75 | 11. 3 ft for \$1.50 | or | 9 ft for \$5.00 |
| 2. 5 lb for \$1.60 | or | 10 lb for \$3.40 | 12. 4 lb for \$1.60 | or | 6 lb for \$2.50 |
| 3. 6 for \$1.40 | or | 12 for \$2.50 | 13. 5 for \$1.39 | or | 15 for \$4.00 |
| 4. 4 m for \$11.25 | or | 12 m for \$34.00 | 14. 15 m for \$25 | or | 10 m for \$18 |
| 5. 2 mL for \$29 | or | 12 mL for \$170 | 15. 5 oz for \$9.75 | or | 10 oz for \$19.75 |
| 6. 5 kg for \$3.98 | or | 10 kg for \$7.60 | 16. 5 kg for \$1.89 | or | 10 kg for \$3.60 |
| 7. 8 ft for \$3.60 | or | 16 ft for \$7.50 | 17. 12 ft for \$3.60 | or | 16 ft for \$5 |
| 8. 6 yd for \$24.98 | or | 12 yd for \$48.75 | 18. 8 yd for \$24 | or | 12 yd for \$35 |
| 9. 12 for \$1.89 | or | 24 for \$3.75 | 19. 20 for \$1.98 | or | 25 for \$2.50 |
| 10. 15 yd for \$550 | or | 30 yd for \$1075 | 20. 15 yd for \$350 | or | 30 yd for \$690 |

THINK IT
THROUGH



If a basketball player scores 18 free throws for every 24 attempts, how many does she score in 48 attempts? in 72 attempts? in 60 attempts?

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POWER BUILDER B

Determine the better buy. Circle it.

- | | | | | | |
|---------------------|----|-------------------|----------------------|----|------------------|
| 1. 5 ft for \$1.79 | or | 2 ft for 80¢ | 11. 6 ft for \$1.80 | or | 2 ft for 55¢ |
| 2. 4 lb for \$1.80 | or | 6 lb for \$2.90 | 12. 18 lb for \$3.25 | or | 9 lb for \$1.75 |
| 3. 24 for \$10 | or | 36 for \$14.25 | 13. 24 for \$10 | or | 12 for \$5.25 |
| 4. 15 m for \$25 | or | 5 m for \$8 | 14. 5 m for \$35 | or | 15 m for \$104 |
| 5. 5 oz for \$9.75 | or | 10 oz for \$19.75 | 15. 100 kg for \$500 | or | 150 kg for \$700 |
| 6. 100 kg for \$250 | or | 50 kg for \$136 | 16. 4 L for \$9 | or | 6 L for \$13 |
| 7. 16 ft for \$12 | or | 24 ft for \$17.50 | 17. 16 ft for \$3.60 | or | 32 ft for \$7.00 |
| 8. 6 for \$40 | or | 15 for \$104 | 18. 3 bags for \$12 | or | 5 bags for \$21 |
| 9. 10 for \$30 | or | 25 for \$81 | 19. 10 for \$29.99 | or | 15 for \$49.99 |
| 10. 12 yd for \$300 | or | 18 yd for \$550 | 20. 15 yd for \$750 | or | 20 yd for \$950 |

THINK IT
THROUGH



If Raoul has 24 hits for every 36 times at bat, how many hits can we expect from him in 72 times at bat? in 90 times at bat? in 108 times at bat?

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When we multiply a mixed number on paper, we change it to an improper fraction.

$$8 \times 4\frac{3}{4}$$

$$\frac{8}{1} \times \frac{19}{4}$$



THAT'S TOO HARD
TO DO IN MY HEAD!

Here's a better way to multiply in your head:

Break the mixed number into parts.

Multiplying by parts makes the calculation much easier.

$$\begin{array}{r} 8 \\ 4 \times 8 = 32 \\ + \\ \frac{3}{4} \times 8 = 6 \\ \hline 8 \times 4\frac{3}{4} = 32 + 6 = 38 \end{array}$$

Sometimes subtraction works. **THINK ...**



$4\frac{3}{4}$ is $\frac{1}{4}$ less than 5.

$$8 \times (5 - \frac{1}{4}) = 40 - 2 = 38$$

Choose whichever is easier for you.

TRY THESE IN YOUR HEAD.
Break mixed numbers into parts.



1. $4 \times 2\frac{1}{2}$

4. $8 \times 2\frac{1}{4}$

7. $5\frac{3}{4} \times 8$

2. $6 \times 3\frac{1}{2}$

5. $8 \times 1\frac{7}{8}$

8. $16 \times 2\frac{3}{8}$

3. $12 \times 4\frac{1}{2}$

6. $16 \times 2\frac{7}{8}$

9. $100 \times 1\frac{9}{10}$

10. $64 \times 1\frac{1}{4}$

POWER BUILDER A

- | | |
|-------------------------------------|--|
| 1. $3 \times 5\frac{1}{5} =$ _____ | 11. $3 \times 2\frac{1}{2} =$ _____ |
| 2. $5 \times 2\frac{1}{6} =$ _____ | 12. $9 \times 3\frac{2}{3} =$ _____ |
| 3. $2 \times 1\frac{2}{7} =$ _____ | 13. $6 \times 4\frac{2}{3} =$ _____ |
| 4. $4 \times 3\frac{2}{9} =$ _____ | 14. $12 \times 2\frac{3}{4} =$ _____ |
| 5. $4 \times 3\frac{1}{2} =$ _____ | 15. $5 \times 2\frac{3}{5} =$ _____ |
| 6. $2 \times 4\frac{1}{2} =$ _____ | 16. $8 \times 1\frac{3}{4} =$ _____ |
| 7. $3\frac{1}{4} \times 4 =$ _____ | 17. $24 \times 2\frac{1}{3} =$ _____ |
| 8. $2\frac{1}{4} \times 8 =$ _____ | 18. $16 \times 1\frac{5}{8} =$ _____ |
| 9. $1\frac{1}{3} \times 6 =$ _____ | 19. $100 \times 7\frac{7}{10} =$ _____ |
| 10. $2\frac{1}{3} \times 3 =$ _____ | 20. $2\frac{1}{8} \times 64 =$ _____ |

THINK IT THROUGH



If a 6-foot vertical rod casts a shadow 15 feet long, how high is a flagpole that casts a shadow 60 feet long? 75 feet long?

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POWER BUILDER B

- | | |
|-------------------------------------|--|
| 1. $4 \times 2\frac{1}{5} =$ _____ | 11. $5 \times 2\frac{1}{2} =$ _____ |
| 2. $3 \times 3\frac{1}{6} =$ _____ | 12. $9 \times 4\frac{2}{3} =$ _____ |
| 3. $3 \times 2\frac{2}{9} =$ _____ | 13. $8 \times 3\frac{3}{4} =$ _____ |
| 4. $3 \times 2\frac{2}{7} =$ _____ | 14. $15 \times 2\frac{2}{3} =$ _____ |
| 5. $3 \times 2\frac{5}{6} =$ _____ | 15. $15 \times 4\frac{3}{5} =$ _____ |
| 6. $3\frac{1}{4} \times 8 =$ _____ | 16. $16 \times 1\frac{3}{4} =$ _____ |
| 7. $3\frac{1}{6} \times 6 =$ _____ | 17. $24 \times 3\frac{1}{8} =$ _____ |
| 8. $2\frac{1}{4} \times 8 =$ _____ | 18. $9 \times 2\frac{2}{3} =$ _____ |
| 9. $1\frac{1}{3} \times 6 =$ _____ | 19. $100 \times 5\frac{3}{10} =$ _____ |
| 10. $3\frac{1}{5} \times 5 =$ _____ | 20. $3\frac{1}{9} \times 90 =$ _____ |

THINK IT THROUGH



A good mixture for concrete is 1 part cement, $2\frac{1}{4}$ parts sand, 3 parts gravel, and 5 gallons of water. If you start with 9 parts sand, how much of the other ingredients do you need?

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Mental math is a handy tool in the kitchen. Often we want to change a recipe to make more or less. For example . . .

To make 4 loaves, how much of each ingredient do I need?

Dates?

$$4 \times 1\frac{1}{4} \text{ cups}$$

$$4 \times (1 + \frac{1}{4})$$

$$= 4 + 1 = 5 \text{ cups}$$

Water?

$$4 \times \frac{3}{4} = 3 \text{ cups}$$



DATE BREAD (1 loaf)

Dates, cut up	$1\frac{1}{4}$ cups
Boiling water	$\frac{3}{4}$ cup
Baking soda	1 tsp
Eggs	1
Brown sugar	$\frac{3}{4}$ cup
Salt	$\frac{3}{4}$ tsp
Vanilla	1 tsp
Flour	$1\frac{3}{4}$ cups
Baking powder	1 tsp
Chopped nuts	$\frac{1}{2}$ cup
Melted butter	$\frac{3}{8}$ cup

For mixed numbers, try multiplying in parts.

TRY THESE IN YOUR HEAD.

How much would you need of each ingredient?



4 loaves

8 loaves

16 loaves

	DATES	WATER	SODA	EGGS	SUGAR	SALT	VANILLA	FLOUR	B. POWDER	NUTS	BUTTER
4 loaves											
8 loaves											
16 loaves											

POWER BUILDER A

Vegetable Stir Fry
(serves 3 people)

- $\frac{3}{4}$ pounds of fresh shrimp
- $\frac{1}{4}$ cup sliced carrots
- $\frac{2}{3}$ cup chopped broccoli
- $1\frac{1}{2}$ T of finely diced onion
- $1\frac{1}{4}$ cups sliced squash
- $\frac{1}{2}$ cup mushrooms
- $2\frac{1}{3}$ tsp soy sauce
- 1 T cornstarch
- $\frac{1}{8}$ tsp garlic powder
- $2\frac{1}{2}$ T oil

Double the recipe.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

About how much
for 12 people?

11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

**THINK IT
THROUGH**



Which is more: triple two-thirds or
double three-fourths?

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POWER BUILDER B

Trail Mix

- $\frac{1}{2}$ cup shredded coconut
- $\frac{2}{3}$ cup sunflower seeds
- $1\frac{1}{4}$ cups raisins
- $\frac{2}{3}$ cup pecans
- $\frac{1}{3}$ cup chopped walnuts
- $\frac{1}{2}$ cup peanut butter
- $\frac{3}{4}$ cup honey
- $2\frac{1}{3}$ cups oats
- $1\frac{1}{2}$ tsp vanilla
- $1\frac{1}{4}$ tsp cinnamon

Double the recipe.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Triple the recipe.

11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

**THINK IT
THROUGH**



Which is more: triple two-fifths or
double three-eighths?

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